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SEQUENCE LISTING

<110> Wright, David A.
Voytas, Daniel F.

<120> Plant Retroelements and Methods Related Thereto

<130> P-1065 ISURF Plant Retroelement

<140> unknown
<141> 1999-05-28

<150> 60/087125
<151> 1998-05-29

<160> 42

<170> PatentIn Ver. 2.0

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<220>
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retroelement sequence

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<211> 1263
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<213> Artificial Sequence

<220>
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retroelement sequence

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<213> Artificial Sequence

<220>
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retroelement sequence

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Met Ala Ser Arg Lys Arg Lys Ala Val Pro Thr Pro Gly Glu Ala Ser
1 5 10 15

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Asn Trp Asp Ser Ser Arg Phe Thr Phe Glu Ile Ala Trp His Arg Tyr
            20                  25                  30

Gln Asp Ser Ile Gln Leu Arg Asn Ile Leu Pro Glu Arg Asn Val Glu
        35                  40                  45

Leu Gly Pro Gly Met Phe Asp Glu Phe Leu Gln Glu Leu Gln Arg Leu
    50                  55                  60

Arg Trp Asp Gln Val Leu Thr Arg Leu Pro Glu Lys Trp Ile Asp Val
65                  70                  75                  80

Ala Leu Val Lys Glu Phe Tyr Ser Asn Leu Tyr Asp Pro Glu Asp His
                85                  90                  95

Ser Pro Lys Phe Trp Ser Val Arg Gly Gln Val Val Arg Phe Asp Ala
            100                 105                 110

Glu Thr Ile Asn Asp Phe Leu Asp Thr Pro Val Ile Leu Ala Glu Gly
        115                 120                 125

Glu Asp Tyr Pro Ala Tyr Ser Gln Tyr Leu Ser Thr Pro Pro Asp His
    130                 135                 140

Asp Ala Ile Leu Ser Ala Leu Cys Thr Pro Gly Gly Arg Phe Val Leu
145                 150                 155                 160

Asn Val Asp Ser Ala Pro Trp Lys Leu Leu Arg Lys Asp Leu Met Thr
                165                 170                 175

Leu Ala Gln Thr Trp Ser Val Leu Ser Tyr Phe Asn Leu Ala Leu Thr
            180                 185                 190

Phe His Thr Ser Asp Ile Asn Val Asp Arg Ala Arg Leu Asn Tyr Gly
        195                 200                 205

Leu Val Met Lys Met Asp Leu Asp Val Gly Ser Leu Ile Ser Leu Gln
    210                 215                 220

Ile Ser Gln Ile Ala Gln Ser Ile Thr Ser Arg Leu Gly Phe Pro Ala
225                 230                 235                 240

Leu Ile Thr Thr Leu Cys Glu Ile Gln Gly Val Val Ser Asp Thr Leu
                245                 250                 255

Ile Phe Glu Ser Leu Ser Pro Val Ile Asn Leu Ala Tyr Ile Lys Lys
            260                 265                 270

Asn Cys Trp Asn Pro Ala Asp Pro Ser Ile Thr Phe Gln Gly Thr Arg
        275                 280                 285
```

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Arg Thr Arg Thr Arg Ala Ser Ala Ser Ala Ser Glu Ala Pro Leu Pro
    290                 295                 300

Ser Gln His Pro Ser Gln Pro Phe Ser Gln Arg Pro Arg Pro Pro Leu
305                 310                 315                 320

Leu Ser Thr Ser Ala Pro Pro Tyr Met His Gly Gln Met Leu Arg Ser
                325                 330                 335

Leu Tyr Gln Gly Gln Gln Ile Ile Ile Gln Asn Leu Tyr Arg Leu Ser
            340                 345                 350

Leu His Leu Gln Met Asp Leu Pro Leu Met Thr Pro Glu Ala Tyr Arg
        355                 360                 365

Gln Gln Val Ala Lys Leu Gly Asp Gln Pro Ser Thr Asp Arg Gly Glu
    370                 375                 380

Glu Pro Ser Gly Ala Ala Ala Thr Glu Asp Pro Ala Val Asp Glu Asp
385                 390                 395                 400

Leu Ile Ala Asp Leu Ala Gly Ala Asp Trp Ser Pro Trp Ala Asp Leu
                405                 410                 415

Gly Arg Gly Ser Glx
            420
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<211> 1596
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant retroelement sequence

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ttaaagaagt atttcccaga gtcaaagacc gtcgaacgaa agatggagat ttcttatttc 540
catcaatttc tggatgaatc ccttagcgaa gcactagacc atttccacgg attgctaaga 600
aaaacaccaa cacacagata cagcgagcca gtacaactaa acatattcat cgatgacttg 660
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atggagctcg tcgagaacat ggcggctagc gatcaagcaa tccttcatga tcacacttat 780
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aagcgtacca agagccagag agcaagggaa gccaag 1596

<210> 8
<211> 532
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
retroelement sequence

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1 5 10 15

Ile Glu Ala Thr Cys Arg Arg Asn Asn Ala Ala Arg Arg Arg Arg Glu
20 25 30

Gln Asp Ile Glu Gly Ser Ser Tyr Thr Ser Pro Pro Pro Ser Pro Asn
35 40 45

Tyr Ala Gln Met Asp Gly Glu Pro Ala Gln Arg Val Thr Leu Glu Asp
50 55 60

Phe Ser Asn Thr Thr Thr Pro Gln Phe Phe Thr Ser Ile Thr Arg Pro
65 70 75 80

Glu Val Gln Ala Asp Leu Leu Thr Gln Gly Asn Leu Phe His Gly Leu
85 90 95

Pro Asn Glu Asp Pro Tyr Ala His Leu Ala Ser Tyr Ile Glu Ile Cys
100 105 110

Ser Thr Val Lys Ile Ala Gly Val Pro Lys Asp Ala Ile Leu Leu Asn
115 120 125

Leu Phe Ser Phe Ser Leu Ala Gly Glu Ala Lys Arg Trp Leu His Ser

```
    130                 135                 140

Phe Lys Gly Asn Ser Leu Arg Thr Trp Glu Glu Val Val Glu Lys Phe
145                 150                 155                 160

Leu Lys Lys Tyr Phe Pro Glu Ser Lys Thr Val Glu Arg Lys Met Glu
                165                 170                 175

Ile Ser Tyr Phe His Gln Phe Leu Asp Glu Ser Leu Ser Glu Ala Leu
            180                 185                 190

Asp His Phe His Gly Leu Leu Arg Lys Thr Pro Thr His Arg Tyr Ser
        195                 200                 205

Glu Pro Val Gln Leu Asn Ile Phe Ile Asp Asp Leu Gln Leu Leu Ile
    210                 215                 220

Glu Thr Ala Thr Arg Gly Lys Ile Lys Leu Lys Thr Pro Glu Glu Ala
225                 230                 235                 240

Met Glu Leu Val Glu Asn Met Ala Ala Ser Asp Gln Ala Ile Leu His
                245                 250                 255

Asp His Thr Tyr Val Pro Thr Lys Arg Ser Leu Leu Glu Leu Ser Thr
            260                 265                 270

Gln Asp Ala Thr Leu Val Gln Asn Lys Leu Leu Thr Arg Gln Ile Glu
        275                 280                 285

Ala Leu Ile Glu Thr Leu Ser Lys Leu Pro Gln Gln Leu Gln Ala Ile
    290                 295                 300

Ser Ser Ser His Ser Ser Val Leu Gln Val Glu Glu Cys Pro Thr Cys
305                 310                 315                 320

Arg Gly Thr His Glu Pro Gly Gln Cys Ala Ser Gln Gln Asp Pro Ser
                325                 330                 335

Arg Glu Val Asn Tyr Ile Gly Ile Leu Asn Arg Tyr Gly Phe Gln Gly
            340                 345                 350

Tyr Asn Gln Gly Asn Pro Ser Gly Phe Asn Gln Gly Ala Thr Arg Phe
        355                 360                 365

Asn His Glu Pro Pro Gly Phe Asn Gln Gly Arg Asn Phe Met Gln Gly
    370                 375                 380

Ser Ser Trp Thr Asn Lys Gly Asn Gln Tyr Lys Glu Gln Arg Asn Gln
385                 390                 395                 400

Pro Pro Tyr Gln Pro Pro Tyr Gln His Pro Ser Gln Gly Pro Asn Gln
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405 410 415

Gln Glu Lys Pro Thr Lys Ile Glu Glu Leu Leu Leu Gln Phe Ile Lys
420 425 430

Glu Thr Arg Ser His Gln Lys Ser Thr Asp Ala Ala Ile Arg Asn Leu
435 440 445

Glu Val Gln Met Gly Gln Leu Ala His Asp Lys Ala Glu Arg Pro Thr
450 455 460

Arg Thr Phe Gly Ala Asn Met Glu Arg Arg Thr Pro Arg Lys Asp Lys
465 470 475 480

Ala Val Leu Thr Arg Gly Gln Arg Arg Ala Gln Glu Glu Gly Lys Val
485 490 495

Glu Gly Glu Asp Trp Pro Glu Glu Gly Arg Thr Glu Lys Thr Glu Glu
500 505 510

Glu Glu Lys Val Ala Glu Glu Pro Lys Arg Thr Lys Ser Gln Arg Ala
515 520 525

Arg Glu Ala Lys
530

<210> 9
<211> 603
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant retroelement sequence

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acagttgcat caacaagaaa ggattggtcc ttgaagctcg atgatgctct ctgggcctat 480
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<210> 10
<211> 201

<212> PRT

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
retroelement sequence

<400> 10

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Cys Asp Lys Cys Gln Arg Thr Gly Gly Ile Ser Arg Arg Asn Glu Met
 1               5                  10                  15

Pro Leu Gln Asn Ile Met Glu Val Glu Ile Phe Asp Cys Trp Gly Ile
            20                  25                  30

Asp Phe Met Gly Pro Phe Pro Ser Ser Tyr Gly Asn Val Tyr Ile Leu
        35                  40                  45

Val Ala Val Asp Tyr Val Ser Lys Trp Val Glu Ala Ile Ala Thr Pro
    50                  55                  60

Lys Asp Asp Ala Arg Val Val Ile Lys Phe Leu Lys Lys Asn Ile Phe
65                  70                  75                  80

Ser Arg Phe Gly Val Pro Arg Ala Leu Ile Ser Asp Arg Gly Thr His
                85                  90                  95

Phe Cys Asn Asn Gln Leu Lys Lys Val Leu Glu His Tyr Asn Val Arg
            100                 105                 110

His Lys Val Ala Thr Pro Tyr His Pro Gln Thr Asn Gly Gln Ala Glu
        115                 120                 125

Ile Ser Asn Arg Glu Leu Lys Arg Ile Leu Glu Lys Thr Val Ala Ser
    130                 135                 140

Thr Arg Lys Asp Trp Ser Leu Lys Leu Asp Asp Ala Leu Trp Ala Tyr
145                 150                 155                 160

Arg Thr Ala Phe Lys Thr Pro Ile Gly Leu Ser Pro Phe Gln Leu Val
                165                 170                 175

Tyr Gly Lys Ala Cys His Leu Pro Val Glu Leu Glu Tyr Lys Ala Tyr
            180                 185                 190

Trp Ala Leu Lys Leu Leu Asn Phe Asp
        195                 200
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<210> 11
<211> 600

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
retroelement sequence

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aattgggaaa agtgtcattt catggttcga gagggcatag tcctaggcca caagatctca 600

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<211> 200
<212> PRT
<213> Artificial Sequence

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<223> Description of Artificial Sequence: plant
retroelement sequence

<400> 12
Leu Glu Ala Gly Leu Ile Tyr Pro Ile Ser Asp Ser Ala Trp Val Ser
1 5 10 15

Pro Val Gln Val Val Pro Lys Lys Gly Gly Met Thr Val Val Arg Asp
20 25 30

Glu Arg Asn Asp Leu Ile Pro Thr Arg Thr Val Thr Gly Trp Arg Met
35 40 45

Cys Ile Asp Tyr Arg Lys Leu Asn Glu Ala Thr Arg Lys Asp His Phe
50 55 60

Pro Leu Pro Phe Met Asp Gln Met Leu Glu Arg Leu Ala Gly Gln Ala
65 70 75 80

Tyr Tyr Cys Phe Leu Asp Gly Tyr Ser Gly Tyr Asn Gln Ile Ala Val
85 90 95

Asp Pro Arg Asp Gln Glu Lys Thr Ala Phe Thr Cys Pro Phe Gly Val
100 105 110

Phe Ala Tyr Arg Arg Met Pro Phe Gly Leu Cys Asn Ala Pro Ala Thr

115 120 125

Phe Gln Arg Cys Met Leu Ala Ile Phe Ser Asp Met Val Glu Lys Ser
130 135 140

Ile Glu Val Phe Met Asp Asp Phe Ser Val Phe Gly Pro Ser Phe Asp
145 150 155 160

Ser Cys Leu Arg Asn Leu Glu Arg Val Leu Gln Arg Cys Glu Glu Thr
165 170 175

Asn Leu Val Leu Asn Trp Glu Lys Cys His Phe Met Val Arg Glu Gly
180 185 190

Ile Val Leu Gly His Lys Ile Ser
195 200

<210> 13
<211> 858
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant retroelement sequence

<400> 13
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<211> 286
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant

retroelement sequence

<400> 14

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Lys Glu Glu Pro Leu Ala Leu Pro Gln Asp Leu Pro Tyr Pro Met Ala
 1               5                  10                  15

Pro Thr Lys Lys Asn Lys Glu Arg Tyr Phe Ala Arg Phe Leu Glu Ile
            20                  25                  30

Phe Lys Gly Leu Glu Ile Thr Met Pro Phe Gly Glu Ala Leu Gln Gln
        35                  40                  45

Met Pro Leu Tyr Ser Lys Phe Met Lys Asp Ile Leu Thr Lys Lys Gly
    50                  55                  60

Lys Tyr Ile Asp Asn Glu Asn Ile Val Val Gly Gly Asn Cys Ser Ala
65                  70                  75                  80

Ile Ile Gln Arg Ile Leu Pro Lys Lys Phe Lys Asp Pro Gly Ser Val
                85                  90                  95

Thr Ile Pro Cys Thr Ile Gly Lys Glu Ala Val Asn Lys Ala Leu Ile
            100                 105                 110

Asp Leu Gly Ala Ser Ile Asn Leu Met Pro Leu Ser Met Cys Lys Arg
        115                 120                 125

Ile Gly Asn Leu Lys Ile Asp Pro Thr Lys Met Thr Leu Gln Leu Ala
    130                 135                 140

Asp Arg Ser Ile Thr Arg Pro Tyr Gly Val Val Glu Asp Val Leu Val
145                 150                 155                 160

Lys Val Arg His Phe Thr Phe Pro Val Asp Phe Val Ile Met Asp Ile
                165                 170                 175

Glu Glu Asp Thr Glu Ile Pro Leu Ile Leu Gly Arg Pro Phe Met Leu
            180                 185                 190

Thr Ala Asn Cys Val Val Asp Met Gly Lys Gly Asn Leu Glu Leu Thr
        195                 200                 205

Ile Asp Asn Gln Lys Ile Thr Phe Asp Leu Ile Lys Ala Met Lys Tyr
    210                 215                 220

Pro Gln Glu Gly Trp Lys Cys Phe Arg Ile Glu Glu Ile Asp Glu Glu
225                 230                 235                 240

Asp Val Ser Phe Leu Glu Thr Pro Lys Thr Ser Leu Glu Lys Ala Met
                245                 250                 255
```

```
Val Asn His Leu Asp Cys Leu Thr Ser Glu Glu Glu Glu Asp Leu Lys
            260                 265                 270

Ala Cys Leu Glu Asn Leu Asp Gln Glu Asp Ser Ile Pro Glu
        275                 280                 285


<210> 15
<211> 192
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
      retroelement sequence

<400> 15
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tatgcaacca cagaaaagga gatgctagcc attgtctttg ccttggagaa gttcaggtca 180
tacttgatag gg                                                    192

<210> 16
<211> 64
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
      retroelement sequence

<400> 16
Phe Glu Leu Met Cys Asp Ala Ser Asp Tyr Ala Val Gly Ala Val Leu
  1               5                  10                  15

Gly Gln Arg Lys Asp Lys Val Phe His Ala Ile Tyr Tyr Ala Ser Lys
            20                  25                  30

Val Leu Asn Glu Ala Gln Leu Asn Tyr Ala Thr Thr Glu Lys Glu Met
        35                  40                  45

Leu Ala Ile Val Phe Ala Leu Glu Lys Phe Arg Ser Tyr Leu Ile Gly
    50                  55                  60


<210> 17
<211> 12286
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<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: plant
retroelement sequence

<400> 17
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Tyr Ala Gln Met Asp Gly Glu Pro Ala Gln Arg Val Thr Leu Glu Asp
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Phe Ser Asn Thr Thr Thr Pro Gln Phe Phe Thr Ser Ile Thr Arg Pro
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Glu Val Gln Ala Asp Leu Leu Thr Gln Gly Asn Leu Phe His Gly Leu
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Pro Asn Glu Asp Pro Tyr Ala His Leu Ala Ser Tyr Ile Glu Ile Cys
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Ser Thr Val Lys Ile Ala Gly Val Pro Lys Asp Ala Ile Leu Leu Asn
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Ala Leu Ile Glu Thr Leu Ser Lys Leu Pro Gln Gln Leu Gln Ala Ile
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tactattgtt tcttggatgg ctattccggg tataaccaaa ttgccgttga cccggccgat 300
cattaaaaga cggctttcac atgtccgttt ggagtgttcg cataccgaaa aatgtccttt 360
gggttgtgca atgcaccgac gactttccaa cgatgtgtgc aagccatttt tgccgacctt 420
aatgagaaaa caatggaagt cttcatggat gacttctcgg tatttggtgt atcctttagt 480
ttatgcttgg caaacttgaa aacggtgctt gaaagatgtg tgaagaccaa tcttgtgctt 540
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<210> 30
<211> 192
<212> DNA
<213> Pisum sativum

<400> 30
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tatgccacca ctgaaaaaga attacttgcg atagtgtatg cacttgaaaa gtttaggtct 180
tatcttatag gg 192

<210> 31
<211> 581
<212> DNA

<213> Pisum sativum

<400> 31
tgtgatagtt gccagagaag cggtgggatt ggtaagagag acgagatgtc tctccaaaac 60
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cttatggtaa cgagtatatg cttgtcgcag ttgaggcgat tgcctcacct cgggcggatg 180
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<210> 32
<211> 1362
<212> DNA
<213> Glycine max

<400> 32
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atccttccag agaggaatgt agagcttgga ccagggatgt ttgatgagtt cctgcaggaa 180
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<210> 33
<211> 192
<212> DNA
<213> Glycine max

<400> 33
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ggcaaaattt ttcatgctat ctactacgcc agcaaagttt taaatgatgc acaggttaac 120

tatgctacca cagaaaaaga aatgttggca attgtttatg cacttgaaaa gttcaaatct 180
tatttggtag gc 192

<210> 34
<211> 597
<212> DNA
<213> Glycine max

<400> 34
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gttcccaaga aaggtggaat gacagtggta caaaatgaga ggaatgactt gataccaaca 120
cgaacagtca ctggctggcg aatgtgtatt gactatcaca agctgaatga agctacacgg 180
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gtggagaaaa gcatcgaggt atttatggac gacttctcgg tttttggacc ctcatttgac 480
agctgtttga ggaacctaga aatggtactt cagaggtgcg tagagactaa cttggtactg 540
aattgggaaa agtgtcattt tatggttcga gagggcatag tcctaggcca caagatc 597

<210> 35
<211> 603
<212> DNA
<213> Glycine max

<400> 35
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tcatacagga atgtctacat cttggtagct gtggattacg tctccaaatg ggtggaagcc 180
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tcccatttcg gagtcccacg agccttgatt agtgatgggg gaacgcactt ctgcaacaat 300
cagttgaaga aagtcctgga gcactataat gtccgacaca aggtggccac accttatcac 360
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acagttgcat catcaagaaa ggattgggcc ttgaagctcg atgatactct ctgggcctat 480
aggacagcgt tcaagactcc catcggctta tcaccatttc agctagtata tgggaaggca 540
tgtcatttac cagtagagct ggagcacaag gcatattggg ctctcaagtt gctcaacttt 600
gac 603

<210> 36
<211> 150
<212> DNA
<213> Glycine max

<400> 36
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caatttggcg ccgttgccaa ttgggtgttt gtttgttaca tttgagattt cagacttgct 120
tagatcaagt tctttttcaa ttttcttttt 150

<210> 37

<211> 11
<212> DNA
<213> Glycine max

<400> 37
tggcgccgtt g 11

<210> 38
<211> 15
<212> DNA
<213> Glycine max

<400> 38
tggcgccgtt gccgg 15

<210> 39
<211> 27
<212> DNA
<213> Glycine max

<400> 39
tttttggcgc cgttgtcggg gattttg 27

<210> 40
<211> 9
<212> DNA
<213> Glycine max

<400> 40
tttgggggga 9

<210> 41
<211> 16
<212> DNA
<213> Glycine max

<400> 41
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